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IS : 5594 - 1983
(Reaffirmed 2007)

Indian Standard

(Reaffirmed 2012)

SPECIFICATION FOR WRIST UNIT, ROTARY, FOR HAND PROSTHESYs

(First Revision)

(Reaffirmed 2017)

Artificial Limbs Sectional Committee CPDC 20 Prosthetic and Orthotic Appliances Subcommittee, CPDC 20 1 [Ref Doc CPDC 20 (1516)]

1. Scope

1.1 Covers the general requirements of different types of wrist units (rotary) applicable for upper extremity prosthetic fitting

2. Types

2.1 The wrist units shall be of the following two types

Type 1 Wrist quick disconnect

Type 2 Wrist friction (nylon)

3. Shape and Dimension

3.1 The general shape for Types 1 and 2 wrist units are indicated in Fig 1 and 2 respectively. The dimensions shall be as given in Table 1

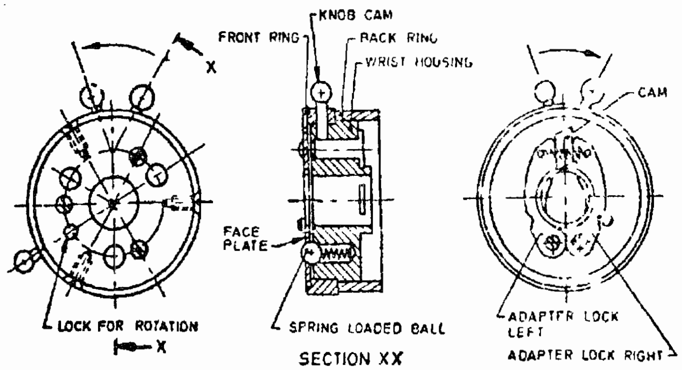

FIG 1 WIRST UNIT QUICK DISCONNECT TYPE

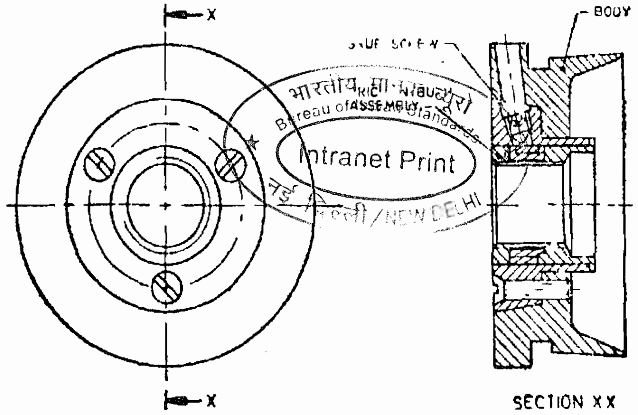

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FIG 2 WRIST UNIT FRICTION (NYLON) TYPE

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NEW DELHI 110002

MAX. RETAIL PRICE
Rs 180.. ALL TAXES

TABLE 1 DIMENSIONS OF TYPE 1 AND 2 WRIST UNITS

(*Clauses* 3 5 3 2 *and* 5 4 2)

Size	Wrist Quick Disconnect, Type 1		Wrist Friction Nylon, Type 2	
	Outer Dia mm	Width mm	Outer Dia mm	Width mm
(1)	(2)	(3)	(4)	(5)
1	46	26	38	19
2	53	26	44	22
3	60	26	50	22

Note 1 Spring loaded claw system for attachment plate adoption is common for all the three sizes The outer dia of attachment plate is matched to suit the size of the unit

Note 2 Insert for terminal device adoption in the wrist friction is common for all the three sizes

4. Materials

4.1 Materials used for different components shall be such as to meet the desired functionability of the components Typical materials are given below however materials having better properties may also be used for the purpose

a) *Housing* — aluminium alloy of designation HE 30 WP of IS 733-1975 Specificition for wrought aluminium and aluminium alloy bars rods and sections (for general engineering purposes) (*second revision*) '

b) *Inserts spindle and knobs* - carbon steel conforming to IS 9550 1980 Specification for bright bars

c) *Steel balls* — conforming to IS 2898-1976 Specification for steel balls for rolling bearings (*first revision*)

d) *Springs* spring steel conforming to Grade 2 of IS 4454 (Part 2) 1975 Steel wires for cold formed springs Part 2 Oil hardened and tempered spring steel wire and valve spring wire unalloyed (*first revision*)

e) *Plates* mild steel sheet conforming to IS 513-1973 Specification for cold rolled carbon steel sheets (*second revision*) '.

5. Construction

5.1 *Terminal Device Adaption* - The Types 1 and 2 wrist shall provide an attachment to the terminal device through standard M 12 x 1 75 thread This provision may be incorporated directly into the wrist unit or by way of the intermediatary attachment plate The wrist unit shall grip the terminal device or an intermediatary attachment plate without any undesirable play The looking device of the adaptor shall be fool proof and shall be capable of being easily manoeuvred by the patient himself

5.2 *Wrist Motion* --*The* wrist unit shall provide rotary motion of terminal device through 360° and shall have provision for locking it at any desired position Relatively moving surfaces on the assembly shall have ground or reamed finish to ensure smooth and trouble free movement of components

5.3 *Wrist Unit Type 1*

5 3.1 In this design (*see* Fig 1) the terminal device adaption is through an intermediatary attachment plate which has M 12 x 1 75 threading The attachment plate may be pushed into the wrist unit against three spring loaded balls and held in place by two spring loaded claws, which lock into the groove of attachment plate adapter The quick ejection of terminal device is possible by operating a knob-cam which dis engages the claws from the grooves

5 3 2 The size of the wrist is decided by outer diameter of the ring front Table 1 gives dimensional details of the three sizes of main components used in wrist quick disconnect Type 1

5.4 *Wrist Unit Type 2*

5.4.1 *Terminal Device Adaption* — In this type of wrist terminal device adaption is made through M12 1 75 threading (partially nylon) without any intermediatary attachment The terminal device may be screwed into the wrist unit directly The rotational locking can be achieved by tightening of a hex

AMENDMENT NO. 2 JULY 1994
TO
IS 5594 : 1983 SPECIFICATION FOR WRIST UNIT, ROTARY, FOR HAND PROSTHESIS

(First Revision)

(*Page* 2, *Table* 1, *col 2,* 3, 4 *and* 5) — Incorporate a tolerance of ± 2 mm for all the entries under 'Outer Dia' and 'Width'.

[*Page* 2, *clause* **4.1**(b)] — Delete this sub-clause and renumber the subsequent sub-clauses.

(MHD 10)

Reprography Unit, BIS, New Delhi, India

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TO
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(*First Revision*)

(*Page* 2, *clause* **4.1**, *second sentence*) — Insert the word 'allcrnale' between the words 'however' and 'materials'

(*Page* 3, *clause* A-0.1, line 3) — Substitute ' 10, 15 and 20 kgf *for* '20, 30 and 50 kgf'

[*Page* 3, *clause* **A-1.1** (c)] — Susbtitute '5 lo 20 kg *for* '5 to 30 kg'

(MHD 10)

Reprography Unit BIS New Delhi, India

alien head grub screw which presses the nylon thread For unlocking the reverse procedure is adopted For easy replacement the nylon threading shall be incorporated in a detachable insert which shall be assembled to the main body by means of three screws The nylon friction threads meant for adaption of terminal device shall be designed to incorporate mild-steel thread to prevent cross threading in the nylon

5.4 2 The size of wnst friction (nylon) is decided by outer-most diameter of the body Table 1 gives dimensional details for the three sizes of mam components of wrist friction (nylon) type.

6. Workmanship and Finish

6.1 All machined components shall be finished smooth and shall be free from any machining flaws

6.2 All aluminium components shall be anodtzed after machining All mild steel components shall be buffed and plated chromium over nickel in accordance with service Grade 2 of IS : 1068-1968 Specification for electroplated coating of nickel and chromium on iron and steel (*first revision*)'

7. Load Test and Torque Test

7.1 The wrist unit shall be capable of withstanding a load applied in the direction of its axis through a terminal device and also resist torques for rotation during normal usage The procedure for carrying out load-test and torque test for various sizes are given in Appendices A and B.

8. Marking

8.1 The wrist unit shall be marked with the following

a) Manufacturer s name initials or recognized trade-mark and

b) With the words Right hand ' or Left hand

c) With the type of wrist unit.

8 1.1 *ISI Certification Marking* — Details available with the Indian Standards Institution

9. Packing

9.1 As agreed to between the purchaser and the supplier

APPENDIX A

(*Clause* 7 1)

LOAD TESTING

A-0. General

A-0.1 The wrist unit shall be subjected to a load test while holding any object through terminal device This test shall be carried to ensure bearing capacity of wrist unit when subjected to a certain specified load in vertical condition Loads (w) shall be 20, 30 and 50 kgf for sizes 1, 2 and 3 respectively.

A-1. Apparatus

A-1.1 The apparatus as shown in Fig 3 shall consist of:

a) wrist unit (in case of quick disconnect wrist an additional intermediatary adaptor plate),

b) a hook with standard M 12 thread for adaption into wrist unit or in intermediatary attachment plate (In case of quick disconnect wrist) and

c) weights suitable for making combination of 5 to 30 kg at interval of S kg.

A-2. Procadure

A-2.1 The hook is fitted into wrist and the assembly is held into vice and weights are put into the hook at interval of 5 kg till the specified load is put.

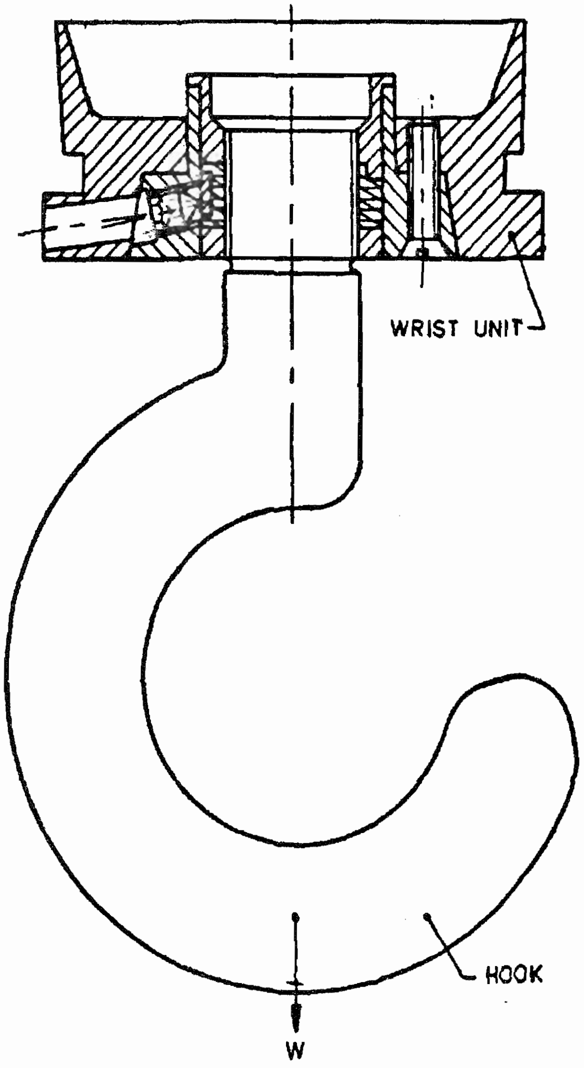

FIG. 3 LOAD TESTING ARRANGEMENT

APPENDIX B

(*Clause* 7.1)

TORQUE TESTING

B-0. General

B-0.1 This test is required in the case of friction wrist units. While holding an object in terminal device, the wrist unit shell not allow rotation by the weight of terminal device, object or while doing any operation against specified tightening of the grub screw. On full tightening of the grub screw a minimum of 10 Nm torque shall be required to rotate the terminal device in the wrist unit.

B-1. Apparatus

B-1.1 The apparatus as shown in Fig. 4 shall consist of

a) friction wrist unit,

b) a hook with M 12 thread, and

c) torque wrench

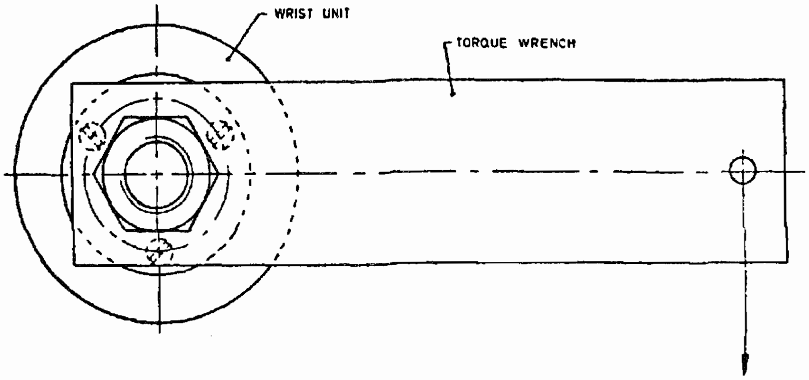

FIG 4 TORQUE TESTING ARRANGEMENT

B-2. Procedure

B-2.1 Screw the hook in wrist unit completely and tight the grub screw with specified rotations after its contact with the nylon bush. Unscrew the hook by torque wrench and measure the required torque for opening it.

EXPLANATORY NOTE

This Indian Standard was first published in 1970 Since then many new developments came into light In this revised standard wrist unit of friction type is included as type 2 Performance oriented load test and torque test have also been included as suggested by ALIMCO, Kanpur.

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